

WHAT IS CLAIMED IS:

1. A solid-state imaging device comprising:  
a semiconductor substrate on which solid-state imaging  
5 elements are formed;

a translucent member provided onto a surface of the  
semiconductor substrate such that spaces are provided to  
be opposed to light receiving areas of the solid-state imaging  
devices, and

10 a through-hole which are formed in the semiconductor  
substrate, wherein

said solid-state imaging device is electrically  
connected to an external contact terminal by way of said  
through-hole.

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2. A solid-state imaging device according to claim  
1, wherein said external contact terminal is formed on a  
surface of the semiconductor substrate, said surface being  
opposed to another surface thereof where the solid-state  
20 imaging element is formed.

3. A solid-state imaging device according to claim  
1, said solid-state imaging device further comprising a  
reinforcing plate which is contacted at a surface side of  
25 the semiconductor substrate, said surface side being opposed  
to another surface of the semiconductor substrate where  
the solid-state imaging element is formed, wherein

said external contact terminal is arranged at a surface  
of the reinforcing plate, said surface being opposed to  
30 another surface of the reinforcing plate where contact  
between the semiconductor substrate and the reinforcing  
plate is made.

4. A solid-state imaging device according to any one  
35 of claims 1 to 3, wherein the translucent member is connected  
to the semiconductor substrate via spacers.

5. A solid-state imaging device according to claim 4, wherein the spacers are formed of same material as the translucent member.

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6. A solid-state imaging device according to claim 4, wherein the spacers are formed of same material as the semiconductor substrate.

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7. A solid-state imaging device according to claim 4, wherein the spacers are formed of resin material.

8. A solid-state imaging device according to claim 7, wherein the spacers are formed of silicon.

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9. A solid-state imaging device according to claim 7, wherein the spacers are formed of 42 alloy.

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10. A solid-state imaging device according to claim 1, wherein said through-hole is filled with a conductive material in an inner wall thereof with an insulating film being formed in-between.

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11. A solid-state imaging device according to claim 10, said insulating film is made of silicon oxide.

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12. A solid-state imaging device according to claim 10 or 11, thickness of said insulating film is no less than  $0.5\mu\text{m}$ .

13. A solid-state imaging device manufacturing method, comprising the steps of:

35 a step of forming a semiconductor substrate on a surface of which a plurality of solid-state imaging devices are arranged and on a back surface side of which external connecting terminals are arranged such that the external

connecting terminals are connected electrically to the solid-state imaging devices via through-holes;

5 a step of jointing a translucent member to a surface of the semiconductor substrate such that spaces are provided to oppose to light receiving areas of the solid-state imaging devices; and

a step of separating a jointed body obtained in jointing step into individual solid-state imaging devices.

10 14. A solid-state imaging device manufacturing method, according to claim 13, wherein the step of jointing the translucent member includes the steps of,

15 preparing a translucent member having a plurality of concave portions at positions that correspond to solid-state imaging device forming regions, and

jointing the translucent member to a surface of the semiconductor substrate.

20 15. A solid-state imaging device manufacturing method, according to claim 13, further comprising, prior to the step of jointing, the step of forming projected portions on a surface of the semiconductor substrate to surround the light receiving areas;

25 wherein spaces are formed between the light receiving areas and the translucent member by the projected portions.

30 16. A solid-state imaging device manufacturing method, according to claim 14, wherein the step of jointing is executed to form spaces between the semiconductor substrate and the translucent member via spacers that are arranged to surround the light receiving areas.

35 17. A solid-state imaging device manufacturing method, according to claim 13, wherein said method is further comprising the steps of:

a step of forming solid-state imaging elements on

a surface of the semiconductor substrate;

a step of forming through-holes at a surface of the semiconductor substrate;

5 a step of forming an insulating film in inner walls of the through-holes, and

a step of filling conductive material in the through-holes.

18. A solid-state imaging device manufacturing method, according to claim 17, wherein the step of forming the insulating  
10 film includes a cold CVD method.

19. A solid-state imaging device manufacturing method, according to claim 18, wherein the step of filling conductive material includes a vacuum screen-printing method.

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